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STRATEGIC MARKET PERSPECTIVE

Development Opportunities in Supply Chain Management

U.S. Systems Integration and Professional
Services Program

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Development Opportunities in Supply Chain Management

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Abstract

Although Supply Chain Management (SCM) is not a new concept the continuing competitive pressures in globalized and increasingly de-regulated economic environments places pressures on firms to continuously seek cost elimination from their systems.

Assisting firms to implement SCM systems through the provision of IT services offers significant opportunities to professional services and systems integration firms.

This report supports IT services firms addressing SCM market opportunities through an examination of user objectives and expectations of benefits from implementing SCM systems.

In doing so, it considers the specific IT related services that users need to support their SCM initiatives including the impact of integrated management products and the Internet.

The report also provides a comprehensive analysis of the performance of IT vendors in meeting user-specific needs regarding the implementation and support of SCM systems.

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***Development Opportunities in Supply Chain
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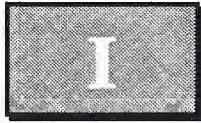
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Introduction

A

Scope and Purpose

1. Scope

The following generally accepted Supply Chain management (SCM) concepts were used by INPUT in the preparation of this report:

- Discrete activities include general administration of the supply chain, accounts payable/receivable, purchasing, order management (e.g., entry or processing), distribution logistics, manufacturing, order fulfillment, warehousing and inventory management, routing/scheduling, sales forecasting, order/shipment tracking, and customer service.
- The efficient and effective flow of information across discrete activities is the central information management issue.
- Completion of the entire chain may include a number of combinations of in-house and out-of-house personnel as well as a number of types of technologies owned and/or managed by these respective parties.

2. Purpose

This research report addresses the following major questions:

User objectives in implementing Supply Chain Management (SCM) systems:

- What is the definition of SCM?
- What benefits do users anticipate through the implementation of SCM systems?

IT Services needs for the implementation of SCM systems:

- What are the IT services requirements for SCM systems?
- What is the role and use of integrated business software (e.g., SAP's R/3)?
- What is the impact of the Internet on SCM?
- Who makes SCM IT services decisions?

User perceptions of IT Services vendors in the SCM environment:

- How do users rate IT services for SCM?
- How do vendors rate their own performance in providing IT services for SCM users?
- What are the salient vendor selection criteria?

3. Background

Business process reengineering efforts have led companies to relentless examination of processes to find and eliminate the fat and then refocus the business on meeting the needs and requirements of the customer.

As the crest of reengineering activity passes, the new "lean and mean" company left in its wake appears to be extremely efficient—on paper—but will it work?

- Inventory and logistics costs are high, perhaps 10% of expenses.
- Customers have increased their demands for time-shrinking—requiring an increase in the speed of product flow from raw materials to sold products.
- Companies are just now realizing the high cost of these new, high service levels.
- Fewer employees means a different resource equation, including greater use of technology and outside suppliers.

The overall challenge is to do more with less; that includes meeting demand and managing the entire supply chain.

The new goal is a seamless supply network that minimizes cycle times, strengthens inventory management, cuts transportation costs, and keeps customers happy.

This integrated supply chain will create an efficient and effective flow that extends beyond materials requirement planning and manufacturing resource

planning to a larger collection of the planning, scheduling, and financial tools needed to run a global enterprise.

The new supply chain management (SCM) model will be supported by technology throughout the flow.

Reengineering reduced the number of interfaces and data hand-offs and encouraged wider adoption of the open systems infrastructures that will be required within and between companies.

Much of the needed data is on-line and accessible.

External service provision has become common as companies develop greater comfort with the approach and work with their vendors successfully to ensure the extended enterprise resource.

B

Methodology

This report is based on telephone interviews conducted with representatives of user organizations and vendor companies who were knowledgeable about supply chain management and IT Services activities within their organization.

A total of 103 user interviews and 34 vendor interviews were conducted. Exhibit I-1 identifies key descriptive characteristics of the user sample.

Exhibit I-1

Profile of User Respondents by Industry

Industry	Percent of Sample	Smallest Company (No. of Employees)	Largest Company (No. of Employees)	Average Number of Employees
Communications	1	NA	500,000	NA
Discrete Manufacturing	40	25	300,000	35,500
Process Manufacturing	27	500	120,000	20,900
Retail	4	NA	NA	NA
Services	13	100	20,000	5,500
Transportation	7	NA	NA	NA
Wholesale	8	4	4,000	1,100

n = 103

Source: INPUT

The industries generally considered most active in supply chain management activities are represented.

Companies interviewed ranged in size from small companies to the major corporations of America.

On average, the number of employees at a given company in the sample makes the sample quite representative of the target market for supply chain management IT Services.

Vendors active in applying information technology to supply chain management issues were also interviewed. Thirty-four structured interviews were conducted, along with a number of unstructured vendor interviews.

Exhibit I-2 profiles the information service categories of the vendors participating in the structured interviews, and indicates the percent of their total offerings in each information services category.

Exhibit I-2

Vendor Respondents' Information Technology Offerings

Information Services	Chain Management Category			
	Inbound Logistics (%)	Manufacturing (%)	Outbound Logistics (%)	Services (%)
Services	50	34	53	60
Software	38	46	34	47
Processing	16	15	16	33
Entire Process	34	31	34	47
Total Participants in Chain Component (n)	32	13	32	15

n = 34

Source: INPUT

This table indicates that the vendors who were interviewed provide multiple information service offerings across a number of supply chain components.

C

Report Organization

The remaining chapters of this report comprise:

Chapter II—*Executive Overview*—presents a concise summary of the complete report

Chapter III—*User Objectives in Supply Chain Management*—defines SCM and examines research data concerning the benefits users expect to achieve from the implementation of these systems

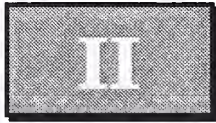
Chapter IV—*Supply Chain Management IT Services*—provides data about the requirements for and use of IT Services to support SCM systems, the effect of integrated software packages, and the impact of the Internet on SCM systems

Chapter V—*SCM IT Services Vendor Performance*—reviews data concerning both user and vendor perceptions of vendor capabilities and performance in the SCM systems arena

Appendix A provides definitions of terms used in this report and shows the SIC codes that comprise each vertical market.

Appendix B provides the user and vendor questionnaires used for the telephone interviews.

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Executive Overview

A

SCM Drives \$20B IT Services Opportunity


Although Supply Chain Management (SCM) is not a new concept the continuing competitive pressures in globalized and increasingly de-regulated economic environments places pressures on firms to continuously seek cost elimination from their systems.

Assisting firms to implement SCM systems through the provision of IT services offers significant opportunities to professional services and systems integration firms. In the US alone, this is expected to represent a market currently worth an estimated \$5.4 billion growing to \$14.6 billion by 2001.

This report can support IT services firms addressing this opportunity through an examination of the following (Exhibit II-1):

- User's objective, and expectations of benefits, from implementing SCM systems, fundamentally being driven by the need for continuous cost-cutting and the requirement to meet ever shorter product life cycles.
- The specific IT related services that users need to support their SCM initiatives including the impact of integrated management products and the Internet.
- The performance of IT vendors in meeting user's specific needs in implementing and supporting SCM systems.

Exhibit II-1



Development Opportunities in SCM

- Understand user objectives
- Identify IT services requirements
- Evaluate performance criteria

Source: INPUT

B**User SCM Systems Objectives**

The main drivers for the use of supply chain management are the needs to reduce costs (or achieve more cost-effective processes) and shrink manufacturing product cycles.

In the last two years, according to several vendors, SCM has contributed to reductions of up to 40% when the entire process has been outsourced.

Beneficiaries of these reductions in costs are also able to manage work better in relation to meeting customer needs.

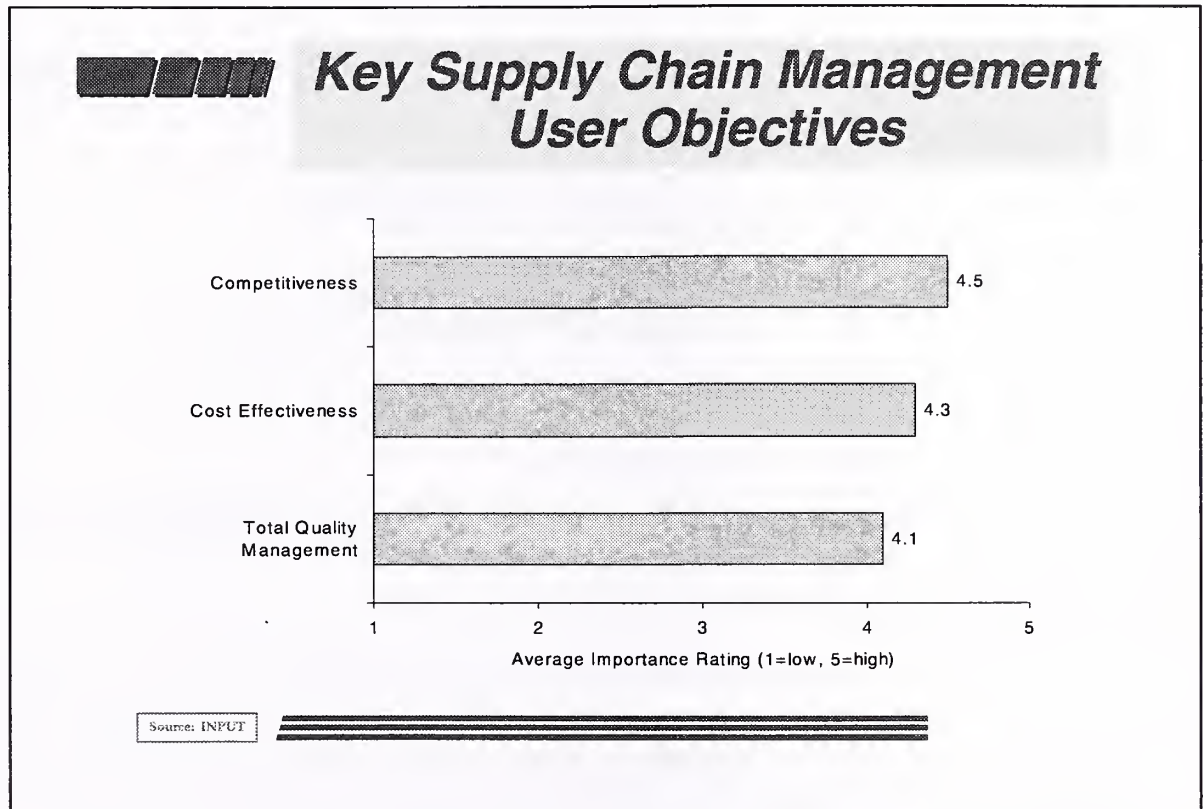
The ability to shrink product cycle time is due to the use of information that makes it possible to supply products to customers as needed without encountering stock shortages.

The range of objectives targeted by users included the ability to achieve more competitiveness, cost effectiveness, and total quality management improvements as shown in Exhibit II-2.

In addition obtaining increased agility and the capability to obtain “time shrinking” improvements were also rated very highly by users.

Electronic Commerce was not highly rated as a major objective by many users. However, those users that did rate it highly were almost uniformly very large companies, the majority of which came from the manufacturing sector.

Exhibit II-2



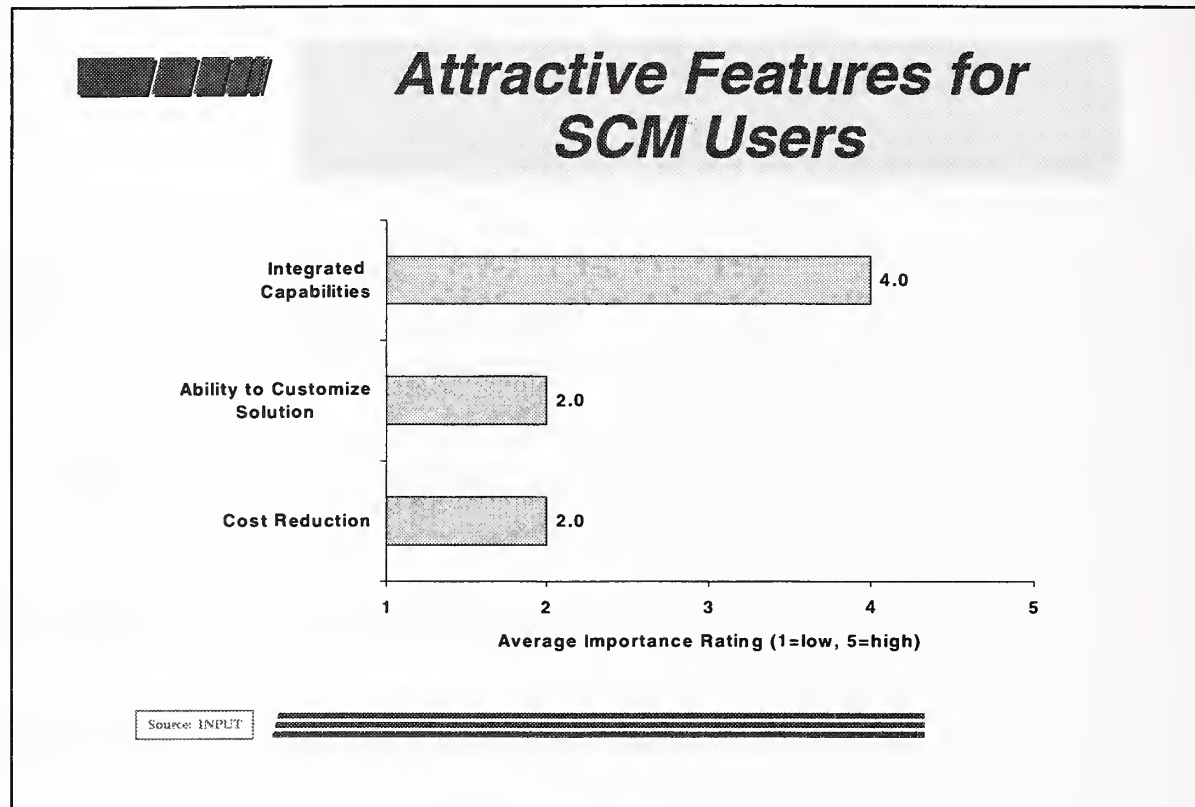
C

SCM IT Services Needs

Vendors addressing the SCM opportunity reported that users were most influenced by the availability of integrated capabilities (Exhibit II-3).

As illustrated in Exhibit II-3, above all, users desire an SCM vendor with a high degree of responsiveness followed closely by their competence and reputation. The vision and global presence of an SCM vendor are secondary considerations.

Exhibit II-3

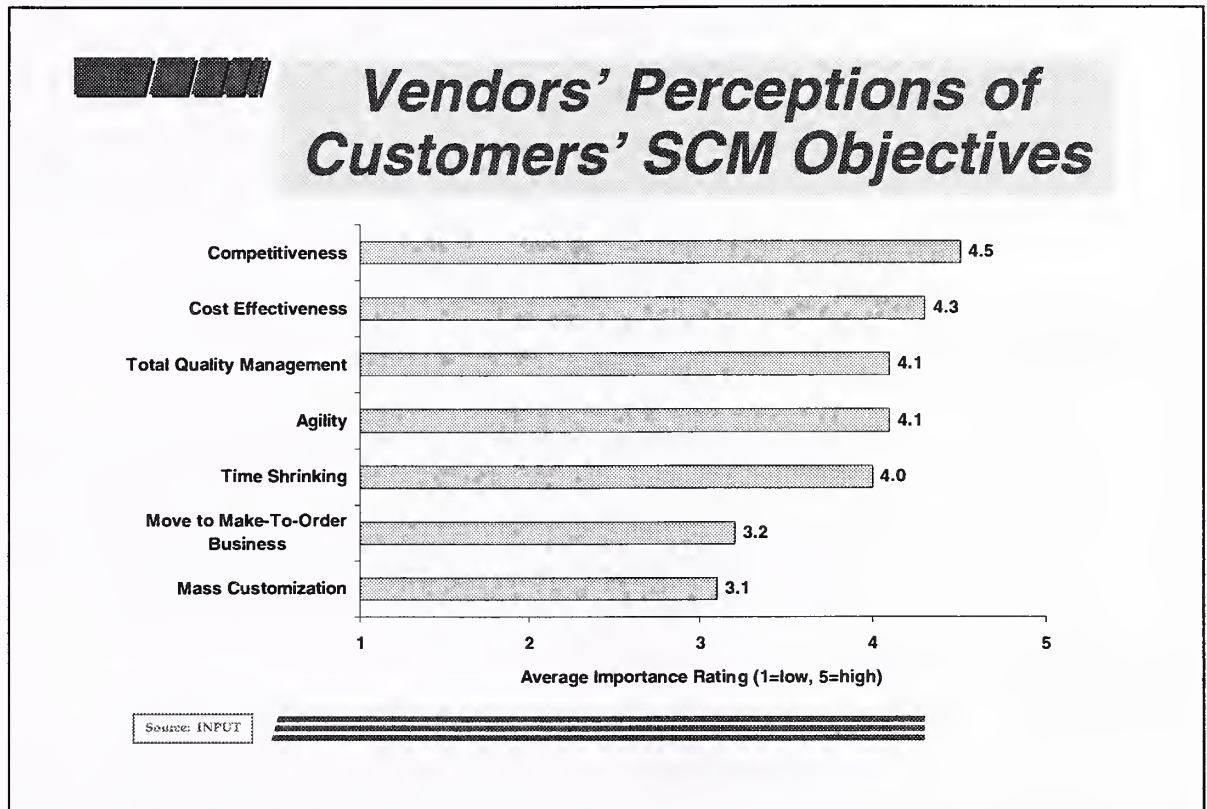


Vendors realize that users want improvements in SCM solutions, but they are not in agreement with the outlook of users or with each other. A few vendors think that more integration is needed. Other vendors think that improvements should be made in specific functional areas, but there is no agreement on the areas to improve.

Among the improvements desired by users to maximize their use of SCM were better integration, and more SCM consulting and training services. Other than a few of the largest firms, vendors in general are not aware that some users are concerned with improving consulting or training so that they can improve their use of SCM.

Only a small percentage of vendors and users are actively pursuing more use of the Internet and electronic commerce, although there is general awareness of these capabilities and industry experts and several large vendors are discussing use of these capabilities.

Exhibit II-4



1. Market Understanding

Vendors demonstrate a good understanding of what users are looking for. The objectives that they feel are being pursued with SCM shown in Exhibit II-4, are close to the benefits being sought by users as stated above.

Vendors also demonstrate a good understanding of the selection factors used by SCM outsourcing prospects. They anticipate being graded on their responsiveness above all, followed by their reputation and the competence of their personnel.

Vendors' vision and global presence are less important to users during the selection process.

2. Pricing Considerations

The factors that vendors report as most important in determining price are the cost of meeting requirements and interaction with prospects. Almost one third of vendors feel that covering costs and achieving an adequate margin is the price determinant. About one-fifth of vendors rely more on interacting with users and determining what value the system could have to them in setting the price.

Other pricing factors that vendors report include prices quoted elsewhere in the market and competitive prices.

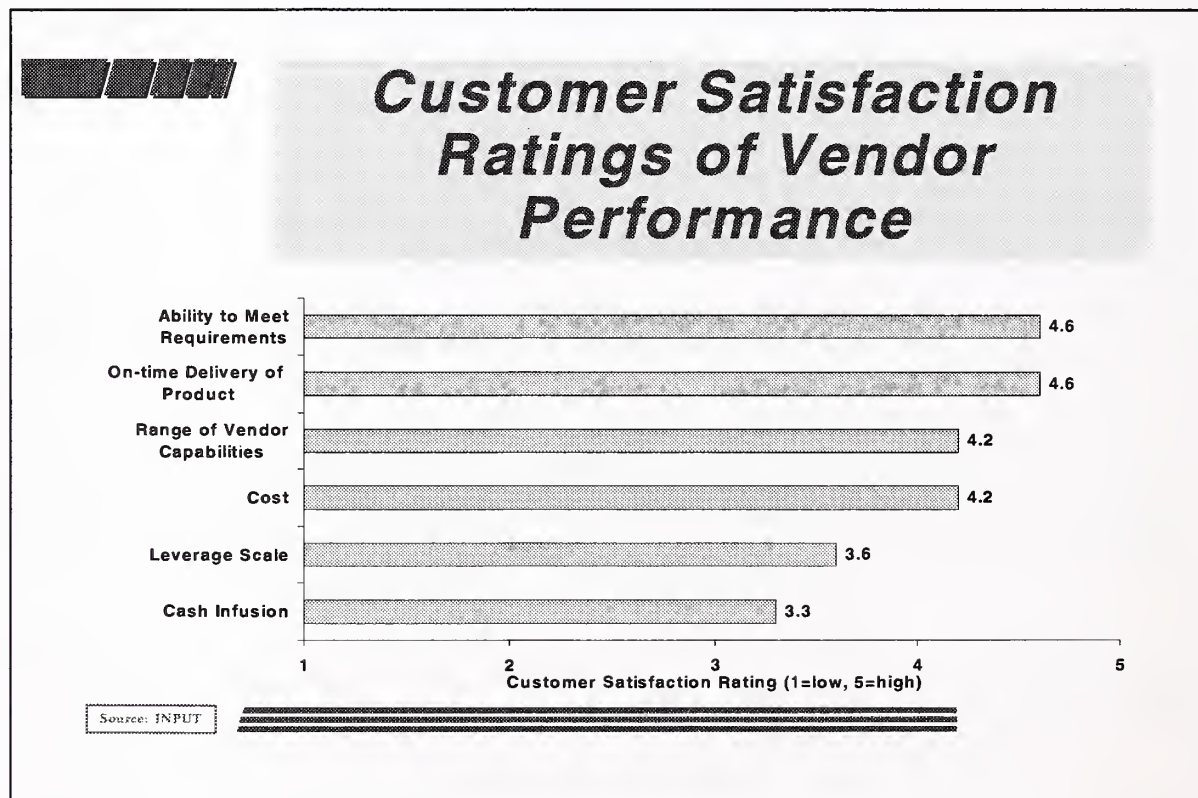
Vendors also feel it is important to emphasize certain features or capabilities to support their pricing. The feature emphasized most often is integration of functions, although the abilities to tailor systems easily and to reduce costs have been used to close deals.

D

IT Services Vendor Performance for SCM

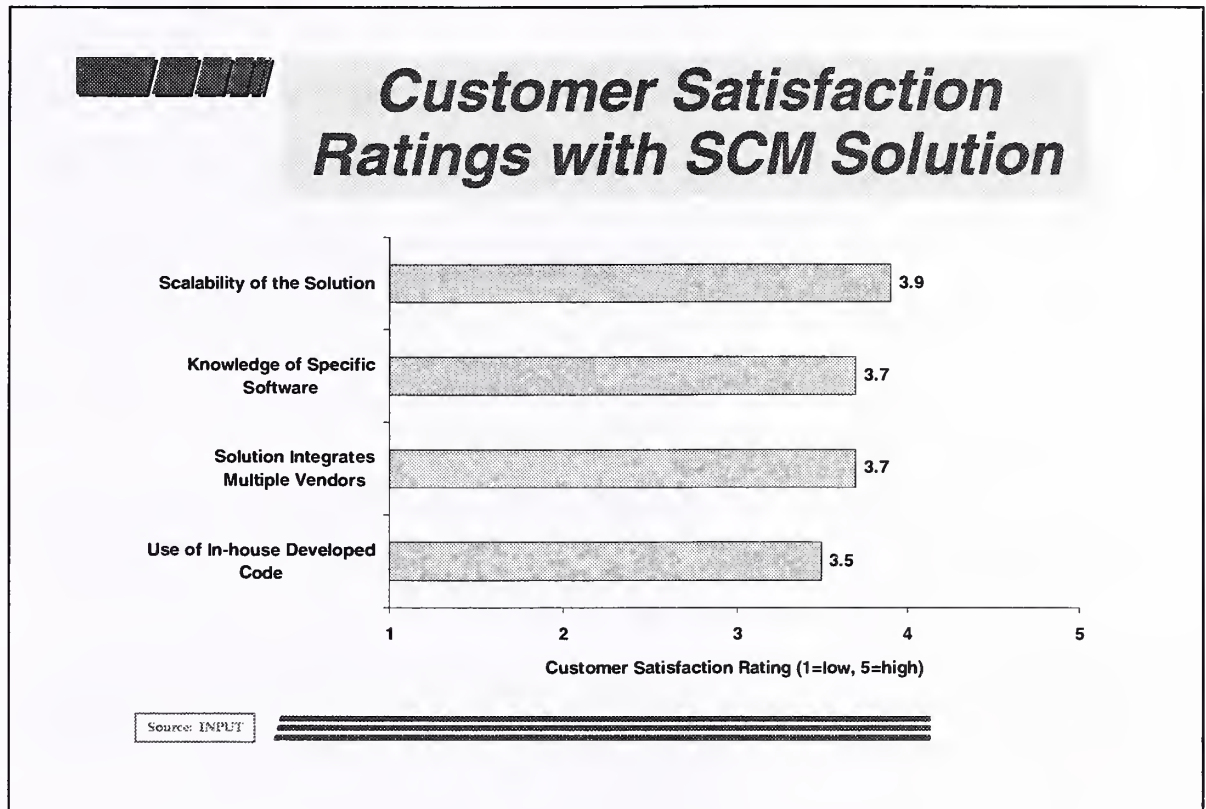
The most important measures of vendor performance by users are the ability to meet requirements and on-time delivery of projects. Next in importance are the capabilities that vendors need to meet those requirements and cost control. Users report a high level of satisfaction in vendors' fulfillment of these key measures of performance (Exhibit II-5).

Exhibit II-5



Users feel that vendors do have the capabilities to deliver systems that will meet their needs. They give high ratings to vendors' ability to meet requirements, on-time delivery, the range of vendor capabilities, and vendor cost effectiveness.

Exhibit II-6



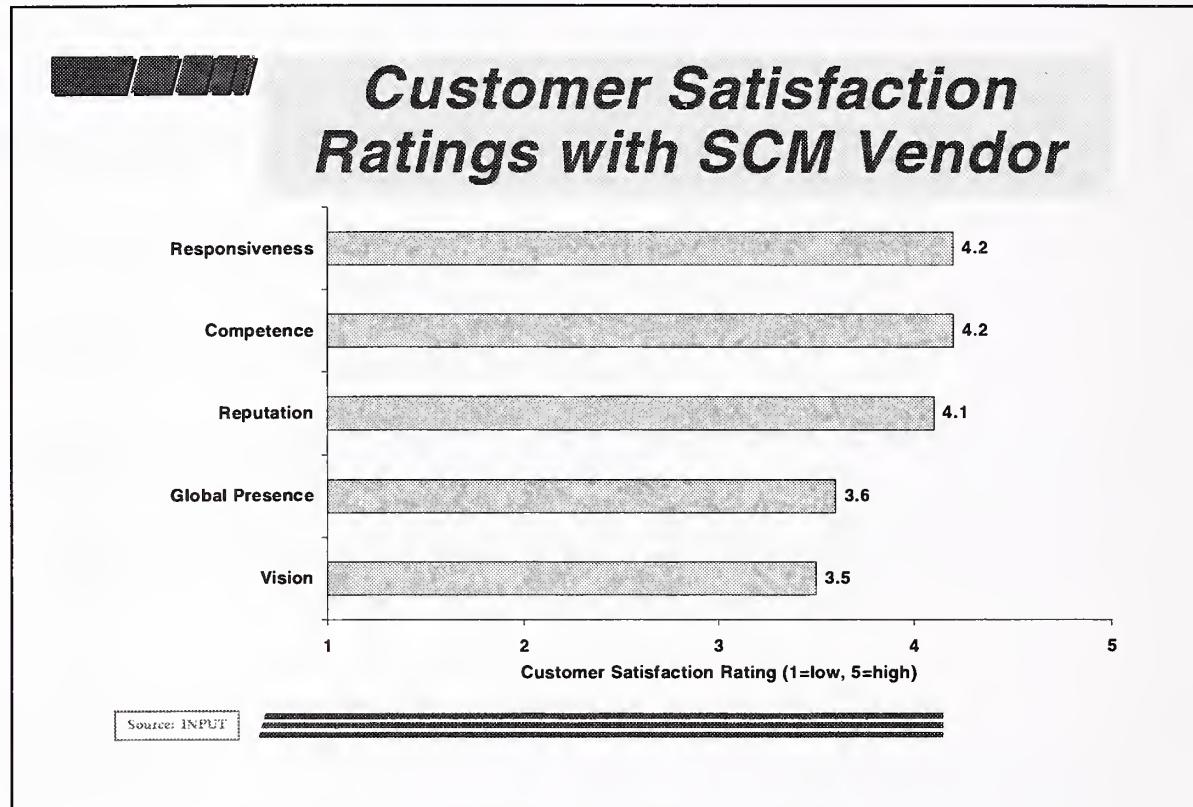
From Exhibit II-6, customers are primarily concerned with the scalability of the solution – the ability to readily modify and adjust the SCM process to reflect changes in volume demand.

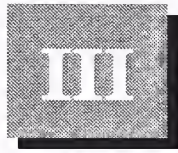
Rating their SCM solutions, customers are generally pleased with scalability; less so regarding the required knowledge of specific software, the integration of multiple vendors, and the use of in-house code.

As shown in Exhibit II-7 on the following page, customers are most impressed with SCM vendors' responsiveness and competence. These factors lend themselves to the next highest rated category, vendor reputation.

Customers are less enthused regarding SCM vendors' global presence and vision.

Exhibit II-7





User Objectives in Supply Chain Management

This chapter examines the user objectives for Supply Chain Management (SCM).

Supply Chain Management is not a new concept, however, re-engineering, downsizing, the need to manage costs in the face of competition, and other forces at work in corporate America have brought the need to sharpen the focus on supply chain management more clearly into focus.

A

Supply Chain Management Definition

In most definitions, the supply chain extends from the point of creation to the point of consumption; from sourcing, to manufacturing, to distribution, to the final sale, and even to post-sale support.

In the context of mass customization, where the goal is giving customers the product when, where, and how they want it, SCM supports the “how”.

Viewed as a management science (i.e., operations research) issue, SCM is a multi-commodity network flow problem with side constraints. It involves feeding all current data into the system, along with goals, and then doing a massive optimization.

Technically, SCM is supported by software that facilitates interactions among modules of the software suite implemented in companies to manage the entire flow of information along the chain components.

Links are created up and down the chain to an optimum point where, theoretically, a sale of a finished good at the back end triggers the purchase of raw material for making the next product at the front end.

Implemented as a perfect system, this linked chain would have no inventory build-up, no stock-outs, and a minimized time from raw material to finished product.

Perfect systems don't exist, of course, and frequently companies don't link components such as logistics to accounting or marketing, because the logistics alone is so complex.

The focus on supply chain management is being fueled mainly by two internal forces: rampant and relentless cost cutting and shrinking product cycles.

1. Cost-cutting

The move to more cost-effective processes has impacted personnel resources by eliminating jobs or replacing higher pay workers with low wage, non-union shops.

With either approach there is an increasingly fragmented work culture: low-paid workers get the work done without enthusiasm, loyalty, or "ownership". Or, when jobs are eliminated, the manager-level worker has a few workers who must now do the work of many.

Both approaches force a more vertical, "silo" view of the various components of SCM in which the efficiency of the process may be sacrificed for effectiveness in each silo (e.g., purchasing, transportation, manufacturing, etc.).

Supply chain management offers to bring the horizontal, customer-driven orientation into focus.

SCM also promises to continue to reduce costs, which have fallen in some industries from 10-40% since 1994.

2. Product Cycles

Most companies produce goods and build inventory in response to forecasts, resulting in inventory build-ups or stock-outs.

There are often conflicts between the pull mentality where the customer sets the demand, and the push mentality where the manufacturer anticipates demand.

To those fearing shortages and the costs they cause, reducing inventories seems less attractive.

SCM offers a means of creating efficiencies throughout the processes so that, theoretically at least, the next product is anticipated, produced, and delivered exactly as the last one is being demanded by the customer.

The more manufacturers know about product movement, the more they can trim inventories. Inventory is ignorance.

For large companies that typically require twice the time to ratchet up production (the industry average for a 20% increase is 176 days for a large company versus 84 for a medium-sized company), SCM may make them more competitive.

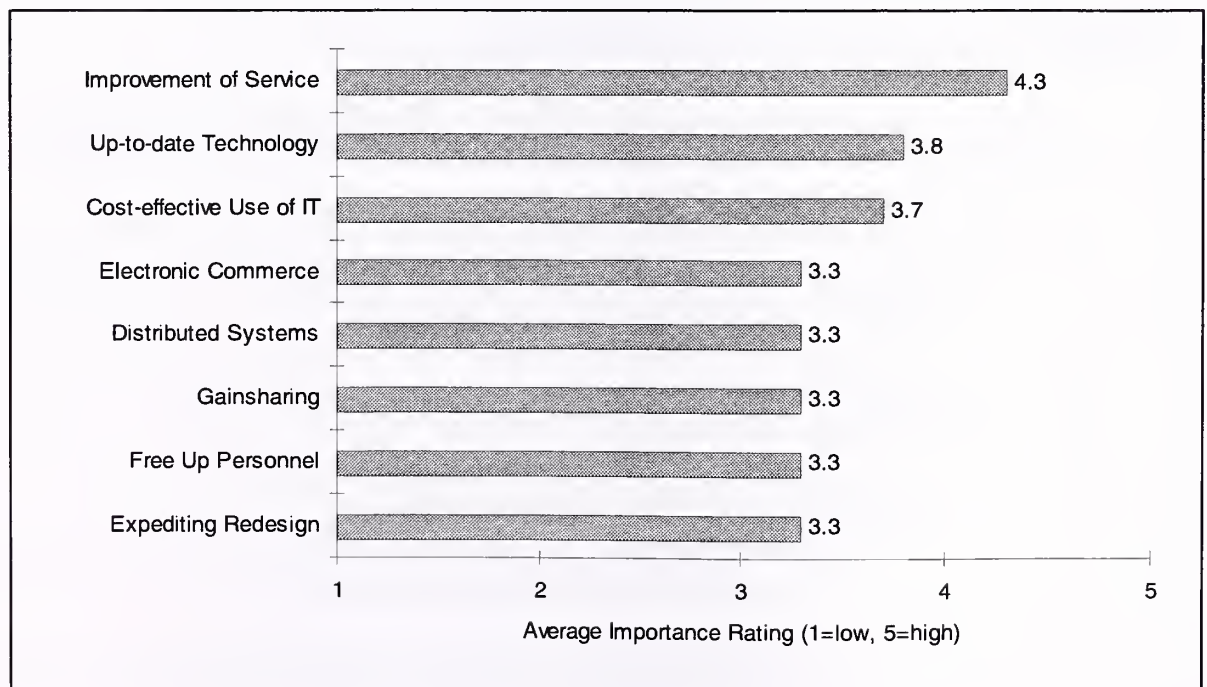
An interesting benefit of SCM is that it replaces inventory with information. Companies of all sizes can gain.

3. Electronic Commerce and Supply Chain Management

As illustrated in Exhibit III-1, the use of electronic commerce is not rated by user respondents as one of the leading benefits of supply chain management.

Exhibit III-1

Electronic Commerce versus Other Benefits of SCM



Source: INPUT

Although electronic commerce does not stand out among benefits of SCM to users, in general, some organizations commented that it is increasing in value as a concern since it can speed up the supply and replenishment process.

Those users rating electronic commerce as an important or very important benefit of SCM were almost uniformly very large companies, 62% of which were in the discrete or process manufacturing industries.

Vendors also reported that electronic commerce was a concern, but ranked it as a lesser benefit than users ranked it, placing it in seventh place among nine benefits.

Over 50% of vendors, including large vendors such as Andersen Consulting and EDS, report that electronic commerce is an area of opportunity.

Several vendors said that interest in electronic commerce will rise as use of the Internet increases.

The use of Internet technologies to locate and fill orders from new sources of supply will place a premium on being able to use fast, standard methods of payment.

Sun is developing capabilities in Java to support electronic commerce on the Internet as a result of inquiries from vendors engaged in SCM applications.

B

Supply Chain Management Benefits

Companies are concentrating on creating superior supply chain performance to build stronger customer relationships and improve financial results.

Effective SCM can smooth out the bumps of business by providing the ability to react quickly to supply/demand and recessionary/inflationary pressures

One key is a process order that is quick, accurate, and efficient.

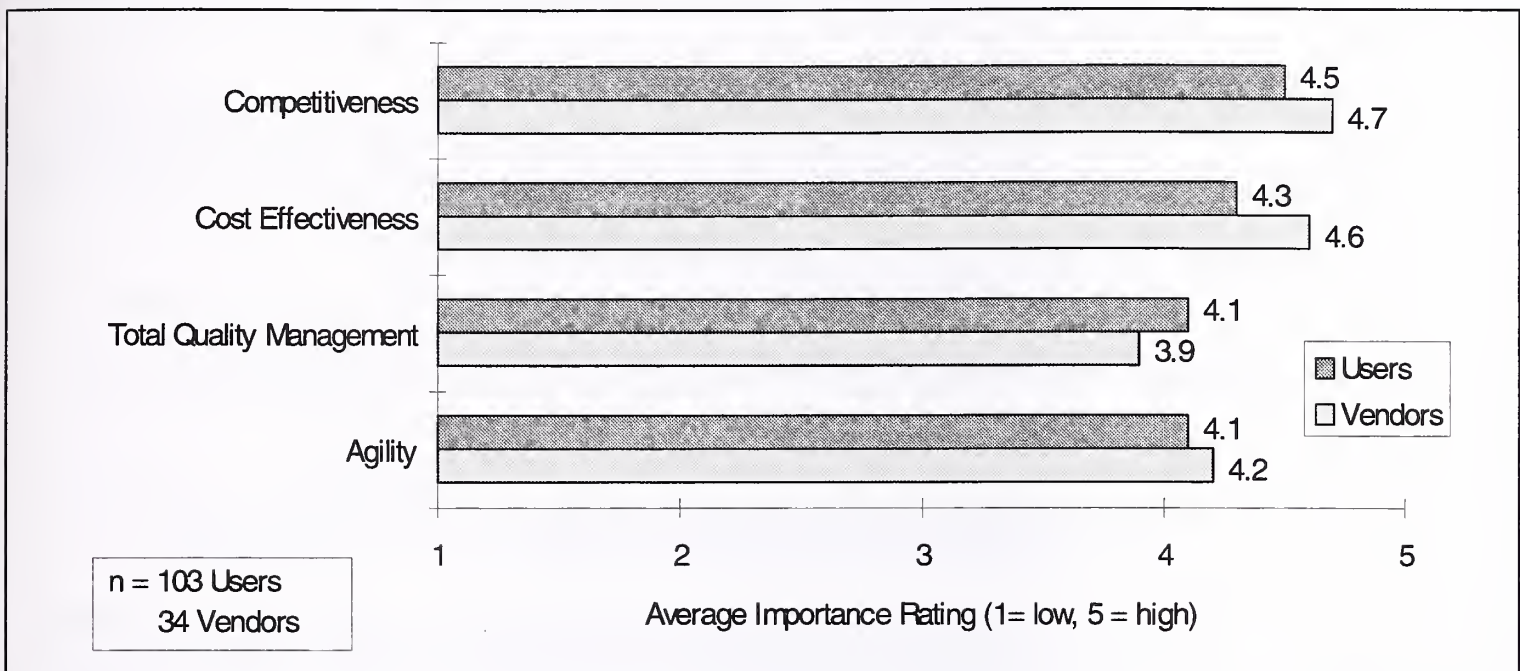
Efficient consumer response includes continuous replenishment, quick response, and vendor-managed inventory.

Exhibit III-2 presents the respondents' views of the importance of business improvements expected from supply chain management systems.

Exhibit III-3 shows a more detailed analysis of the users ratings; Exhibit III-4 shows that for the vendor sample.

Exhibit III-2

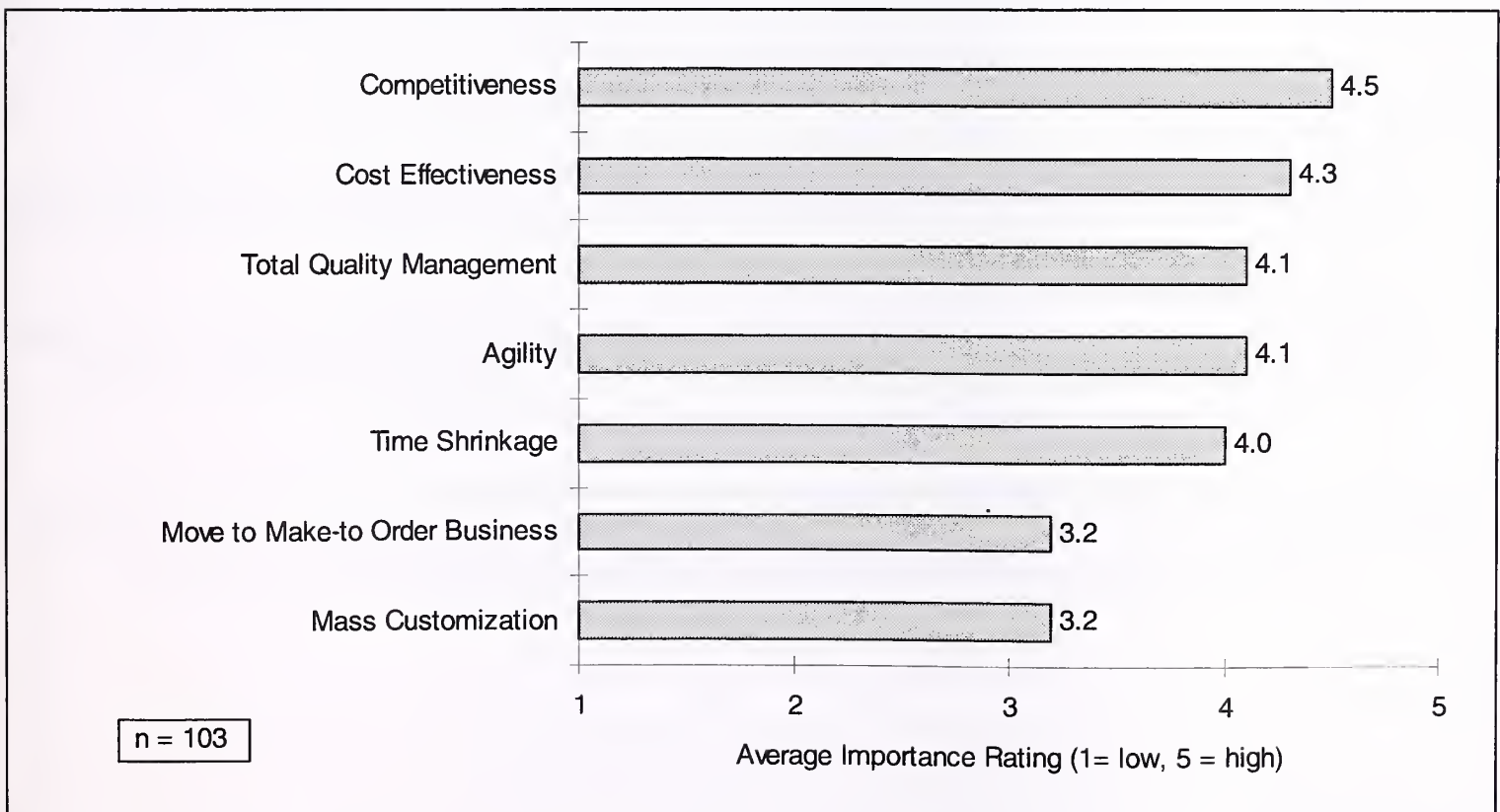
Key Supply-Chain Management Objectives



Source: INPUT

Exhibit III-3

Key User SCM Objectives



Source: INPUT

Users value achieving competitive advantage and improving cost effectiveness through integration as the most important potential benefits of SCM.

The combination of these two as the highest rated benefits suggests that competitiveness has joined cost containment as the ultimate advantages that companies seek. This is consistent with current competitive pressures, cost-cutting trends, and the continuing pressures on pricing.

Specific customer-oriented changes are also important, although mean ratings for these items—becoming more agile, meeting total quality management objectives, and meeting demands for time shrinking—were slightly below the top two.

Desires for these improvements vary both by industry type and by each company's stage in the reengineering cycle.

A number of users commented on combinations of improvements. Several spoke of reducing the inventory levels while improving the order fill rate, a performance that benefits the company and users alike through increased efficiency.

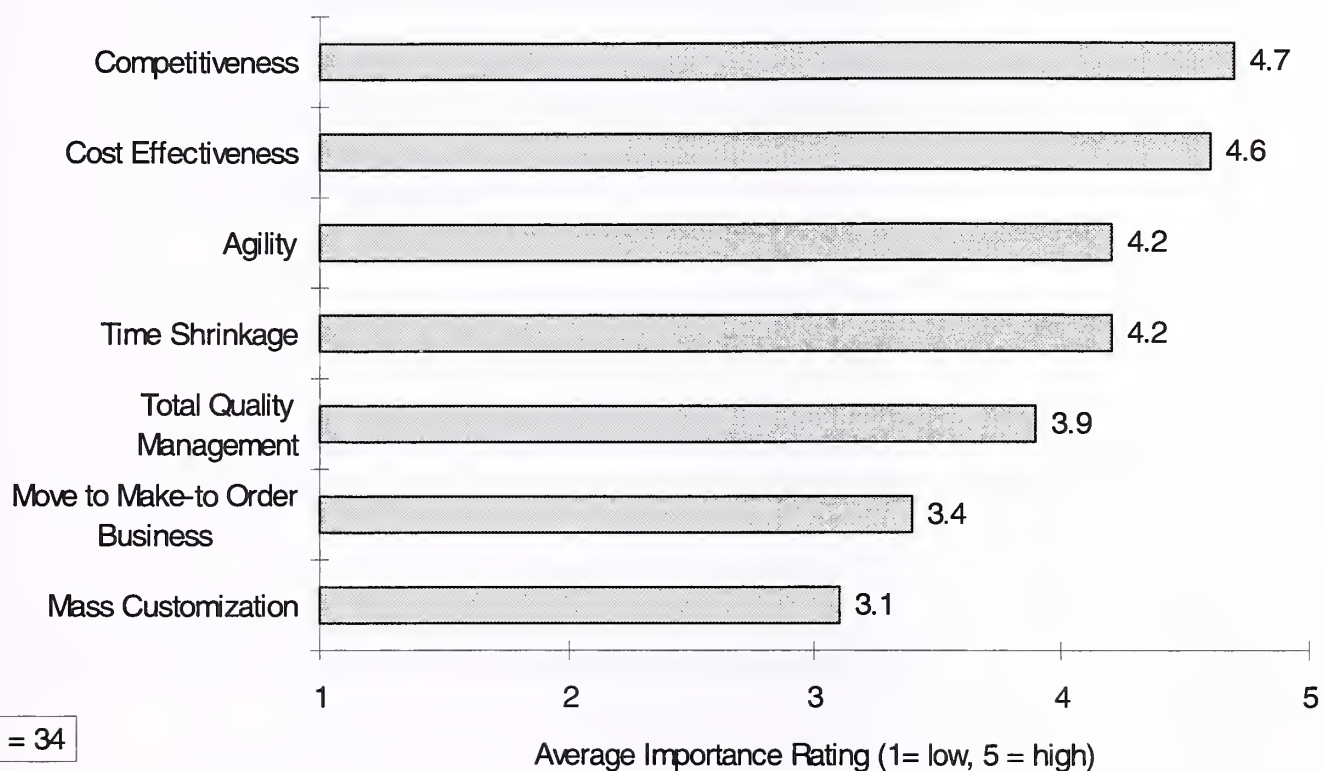
Other users mentioned the importance of inventory strategies in SCM by which capacity could be built up by having goods throughout the chain instead of physically building capacity (e.g., a warehouse or a larger manufacturing plant) and adding unnecessarily to fixed assets.

The least important improvements were the very specific approaches of providing mass customization and changing the business from build-to-store to make-to-order.

Mass customization may not be perceived by users as having the same force as appeasing customers' price concerns and avoiding customer-annoying stock-outs.

Users seem reluctant to change to a make-to-order system because the approach relies on the process—not the product—for success. Until comfort is built up, it is unlikely that traditional inventory levels will decline.

Exhibit III-4

Vendor Perspective of Key User SCM Objectives

Source: INPUT

Vendors strongly agree the improvement of the service function is the most important benefit of SCM outsourcing. Vendors' views on this are in agreement with the users data given in Exhibit III-2, which shows that the highest ranking benefit for users is improvement of the service function.

Cost-effective IT ranks second among vendors as an important benefit of SCM outsourcing, followed by up-to-date technology. This closely correlates to user views: for users, the second most important benefit is followed by cost-effective use of IT and up-to-date technology (Exhibit III-2).

Vendors and users are in close agreement regarding other benefits. Freeing up personnel, which vendors feel is the fifth most important benefit, is tied for fourth place with three other benefits, from the user perspective.

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IV

Supply Chain Management IT Services

This chapter reports on SCM IT services requirements, the potential Internet impact on SCM and on who makes SCM services decisions within the user community.

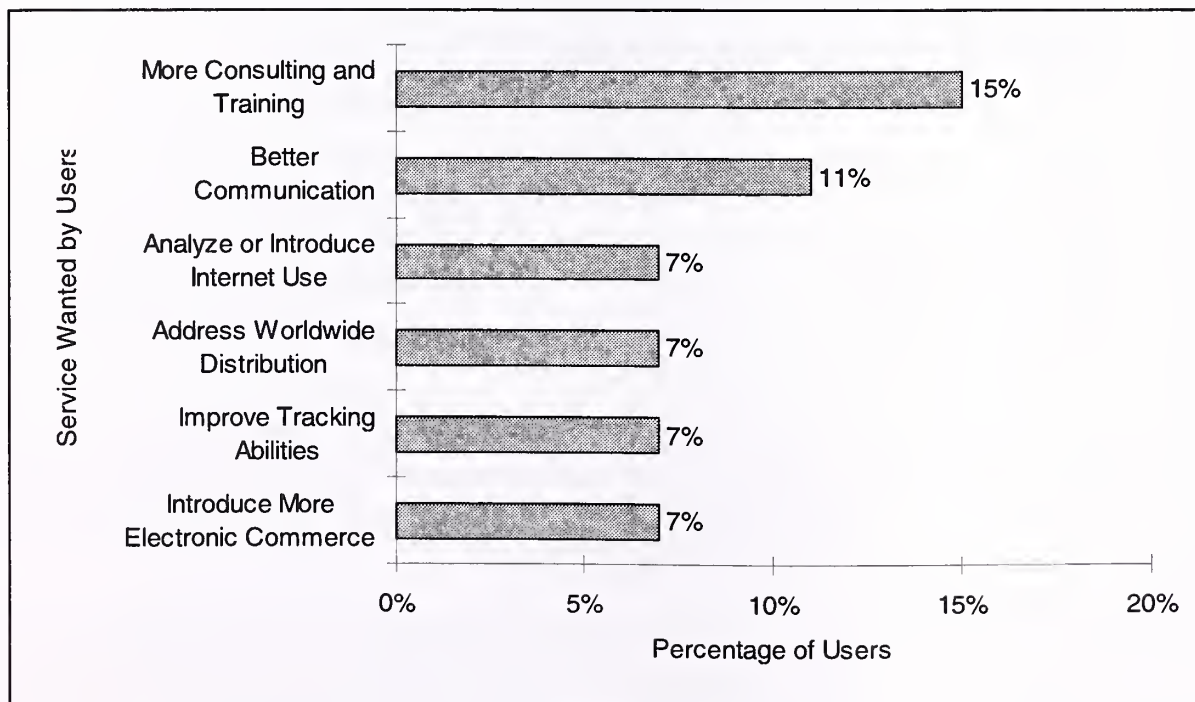
A

Supply Chain Management IT Services Requirements

The specific IT services that users want vendors to provide are compared in Exhibit IV-1.

Exhibit IV-1

Services That Users Would Like Vendors To Provide



Source: INPUT

Both of the highest-ranking suggestions for vendors involve interaction between vendors and users.

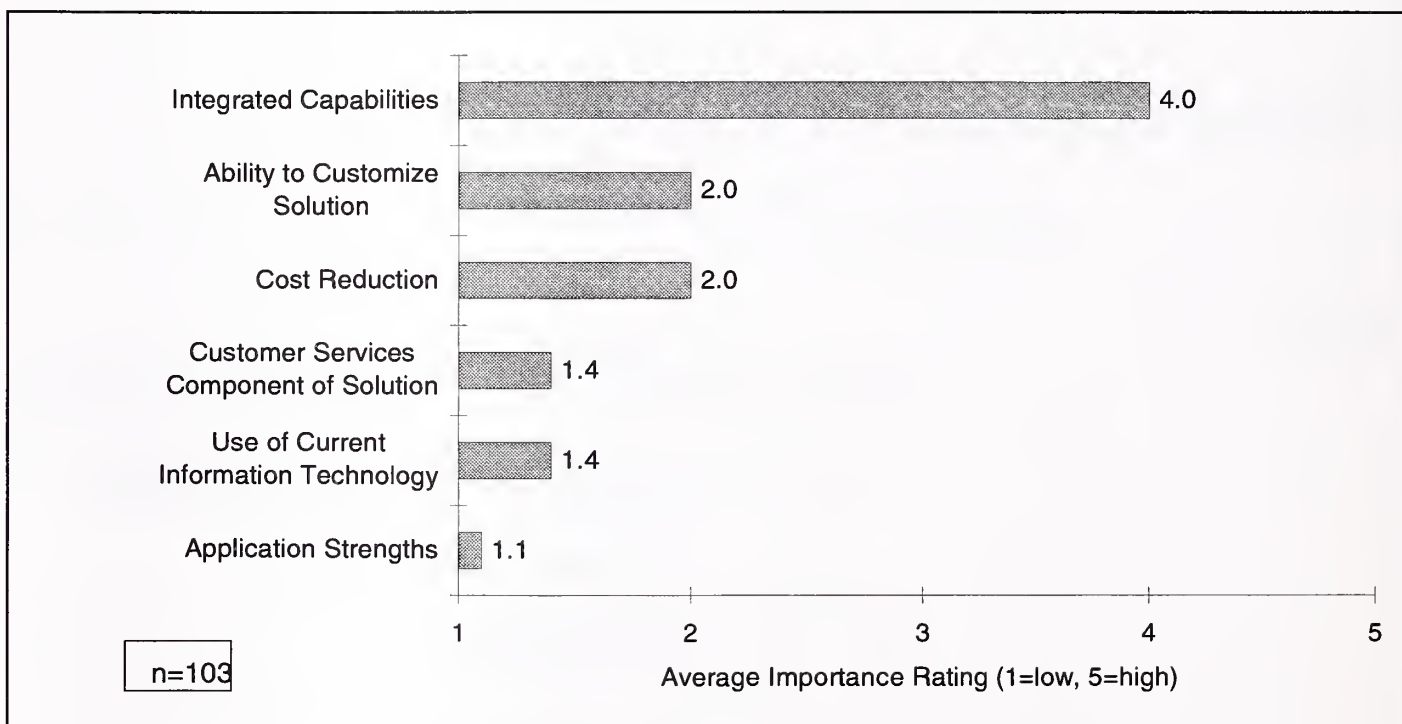
Users feel a need to develop better understanding of the SCM application area as well as of vendor offerings.

Vendors who address this need will improve user satisfaction and can leverage improved communications, consulting, and training to increase business.

Vendors report that prospects for supply chain management outsourcing are most influenced in vendor evaluation by the availability of integrated capabilities, as illustrated in Exhibit IV-2.

Exhibit IV-2

Attractiveness of Vendor Features to Users



Vendors believe that most users expect them to have application strengths and to be using current technology, but may have questions about their use of integrated technology. Consequently, it is important for vendors to stress integrated capabilities.

Users of supply chain management value integrated capabilities highly. They associate the use of integrated capabilities with the ability to achieve cost effectiveness and rank this second only to competitive advantage as a benefit of SCM, as shown in Exhibit III-1.

Users also mention integrated capabilities in relation to the vendors that they feel are leaders in SCM outsourcing, such as Andersen Consulting, Logistics, and Ryder.

Some users also spoke of SAP and Oracle Consulting in regard to integrated capabilities. They felt that these vendors stood out for their ability to integrate functions in the manufacturing and supply areas, but said that they addressed a larger target than SCM.

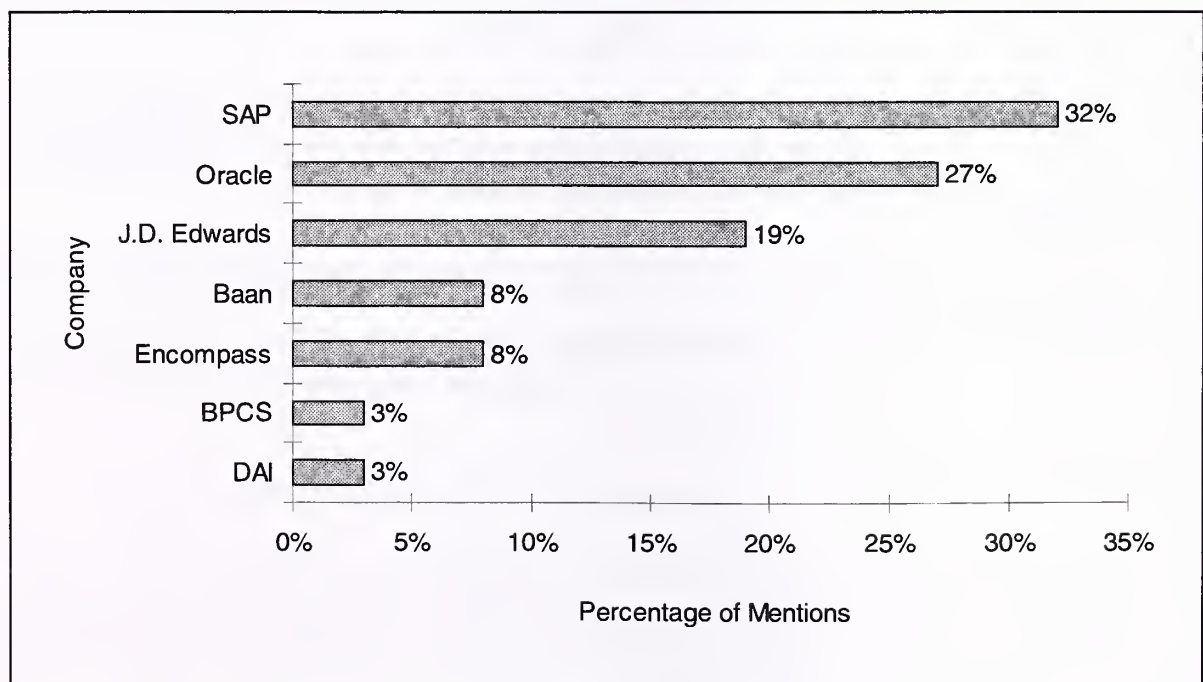
The top tier of integrated software packages used in SCM, according to frequency of mention, includes those offered by the following companies:

- SAP
- Oracle
- J.D. Edwards

The second most-mentioned packages include those from Baan and Encompass, followed by the less frequently mentioned BPCS and DAI offerings (Exhibit IV-3).

Exhibit IV-3

Integrated Software Packages Used for Supply Chain Management



Source: INPUT

B**Internet Impact on SCM**

Less than 10% of user respondents are now using or planning to use the Internet, but use is expected to increase rapidly.

Several user respondents, who stated that they don't currently have plans to use the Internet, have engaged in searches to locate new suppliers.

Industry consultants expect the Internet to have a significant impact on SCM outsourcing for the following reasons:

- The Internet provides an economic means of frequent communication between stages in supply chain management. For example, a significant reduction in the cost of telephone company leased lines can be achieved by using the Internet for communications.
- Interoperability: The Internet provides diverse partners with a standard means of exchanging data, ordering, and paying.
- Electronic commerce capabilities are being implemented on the Internet that will support supply chain management.
- The Internet provides a means of searching for additional sources of supply or other services.

Ten SCM services vendors surveyed revealed that they all expected the Internet to be used in the future. Over half said that existing clients had discussed the Internet with them.

Examples of emerging Internet-based SCM activity include:

- American Software announced in early 1996 that it was starting a joint venture with Intellimedia to offer supply chain management solutions on the Internet.
- A team of 15 vendors and users is developing a prototype virtual private network on the Internet (an "extranet"). The network will involve computer-assisted design and manufacturing as well as EDI. An initial project, for team member Caterpillar Inc., will attempt to shorten the time required for customer-requested product modifications from several weeks to five days.

Competition, the desire to improve customer service, and cost concerns will be strong drivers of an eventual transition to Internet-based SCM.

C

SCM IT Services Decisions

Although company executives are heavily involved in SCM services decisions, IS and functional units are also involved.

In some cases, IS and functional units play a greater role than executives do, as indicated in Exhibit IV-4.

Exhibit IV-4

Participation in SCM Services Decisions

Phase of Work	Decision Maker			
	Company Executives	Business Unit Management	Business Function Management	Information Systems
Outsourcing Decisions	95%	50%	67%	53%
Requirements Definition	60%	77%	80%	67%
Vendor Selection	53%	69%	84%	64%
Vendor Negotiations	42%	68%	88%	53%
Day-to-day Management	19%	64%	96%	78%

Source: INPUT

As Exhibit IV-4 shows, business functional management plays the strongest role in day-to-day situations, but also plays a strong role in vendor selection, negotiation, and requirements definition.

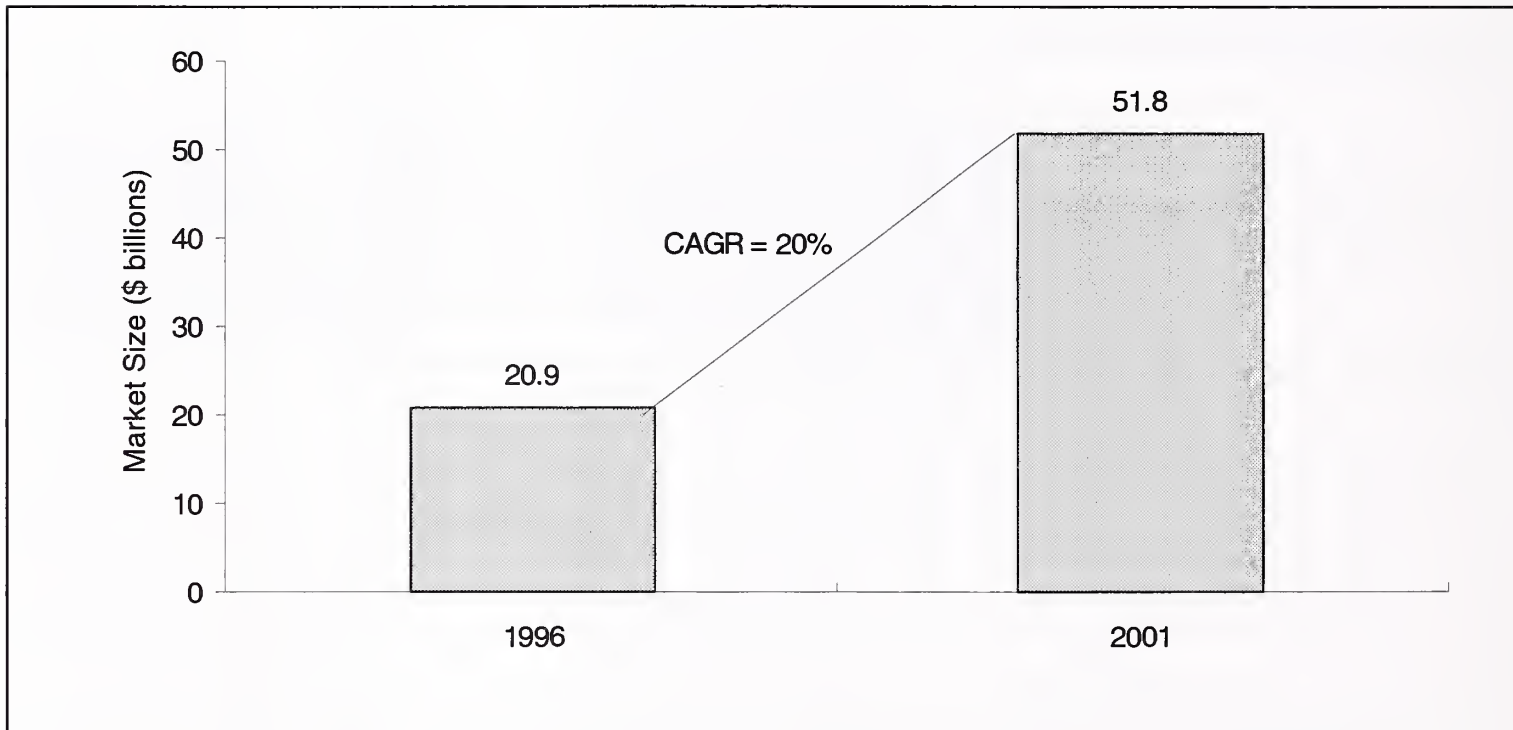
IS and business unit managers and top executives are also more involved in many decisions than many vendors are aware.

The participative nature of decision making for SCM services makes it necessary for vendors to make sure they have made presentations to and/or discussed their strengths and capabilities with all the parties involved.

D**SCM Drives \$20B IT Services Opportunity**

The market for SCM will increase from \$20.9 billion in 1996 to \$51.8 billion in 2001, as shown in Exhibit IV-5.

Exhibit IV-5

Supply Chain Management Market Forecast, 1996-2001*Source: INPUT*

The compound annual growth rate (CAGR) for this market is 20%. Recent growth in supply chain management has been slowed by the lack of integrated software. As availability improves over the next several years, the growth rate will accelerate.



SCM IT Services Vendor Performance

A

User Ratings for IT Services

Users gauge their satisfaction with vendor performance in delivering SCM services according to two primary areas of importance:

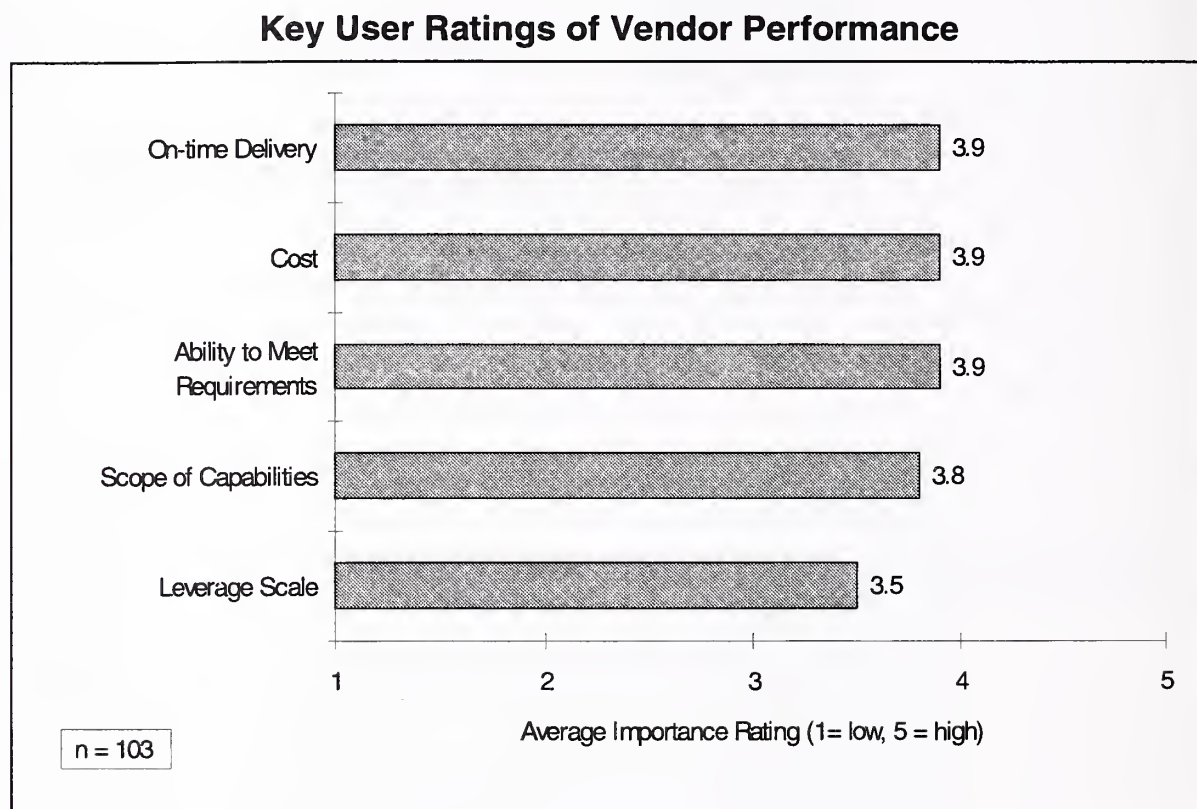
- On-time delivery of projects
- Ability to meet requirements.

The second tier of performance areas important to satisfying users includes:

- Range of vendor capabilities
- Cost.

Many users mentioned one other factor that was also important to them: the ability to leverage economies of scale (see Exhibit V-1).

Exhibit V-1



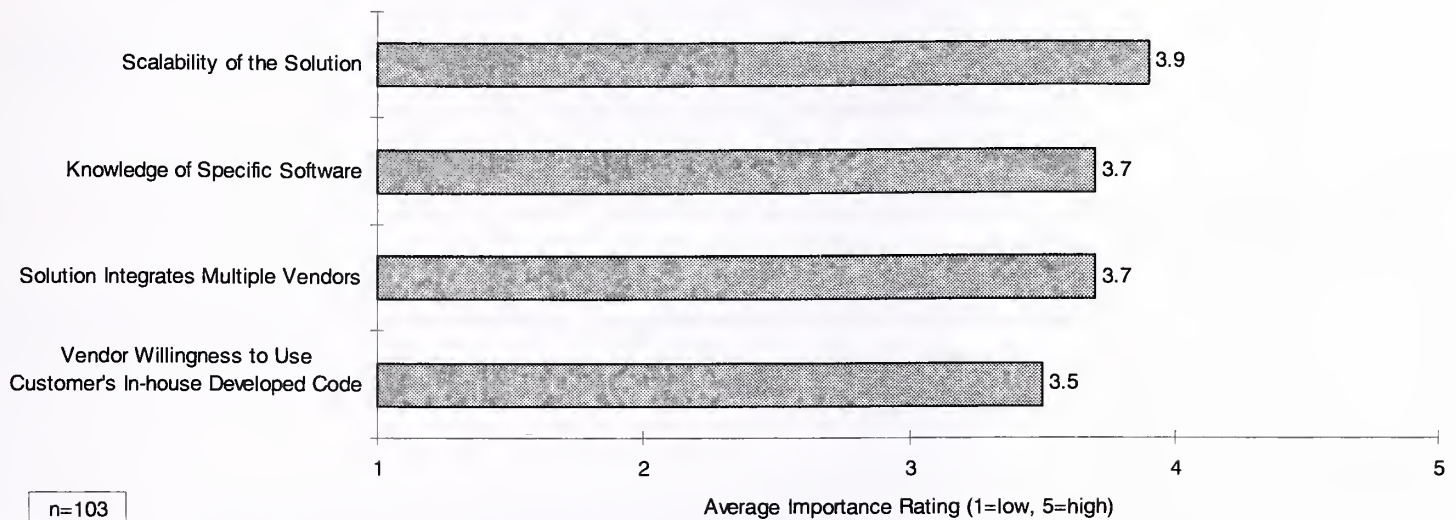
Source: INPUT

In regard to the factors users rated as important to their satisfaction with the SCM solution, knowledge of specific software was most important.

Tied for second place in user satisfaction with the SCM solution were integration of multiple vendors and scalability.

Less important was a vendor's willingness to use the user's in-house-developed code. See Exhibit V-2.

Exhibit V-2

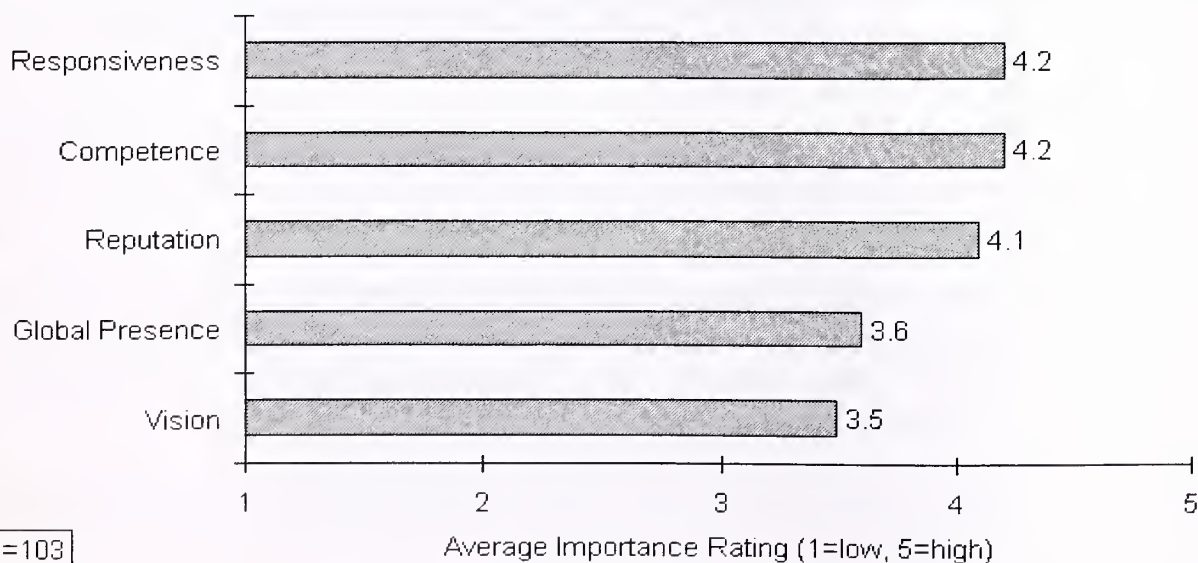
Customer Satisfaction Ratings with SCM Solution

Source: INPUT

Because the software component of solutions has played an important role for vendors, the ranking of user satisfaction with a vendor's knowledge of software is an important indication of business satisfaction.

Users display a high to moderate level of satisfaction with vendor capabilities, as shown in Exhibit V-3.

Exhibit V-3

Customer Satisfaction Ratings with SCM Vendor

Source: INPUT

Vendor reputation and personnel competence, as well as speed of response, are ranked high in the preceding exhibit, but the vision of vendors and their ability to provide solutions on a worldwide basis is ranked lower.

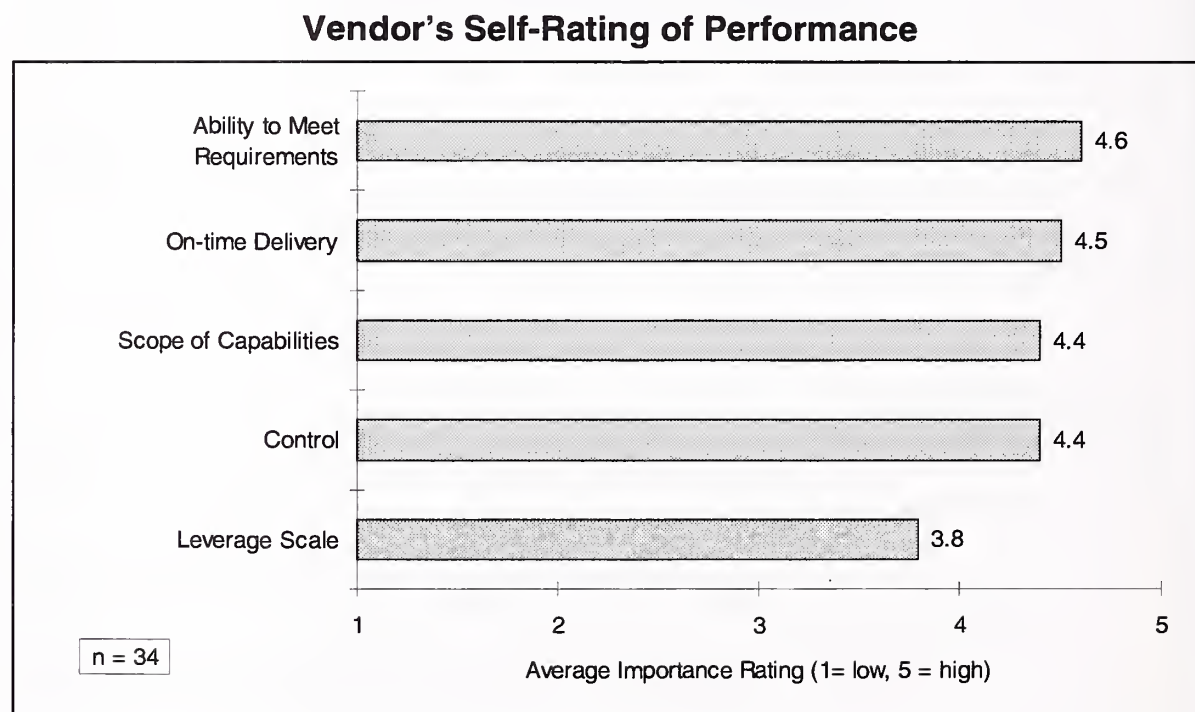
Major vendors in the field, including Andersen Consulting and EDS, are addressing these two factors in particular.

B

Vendor Perspective

Vendors rate their performance on SCM contracts at a high level in terms of meeting requirements, on-time delivery, control, and range of capabilities, as shown in Exhibit V-4.

Exhibit V-4

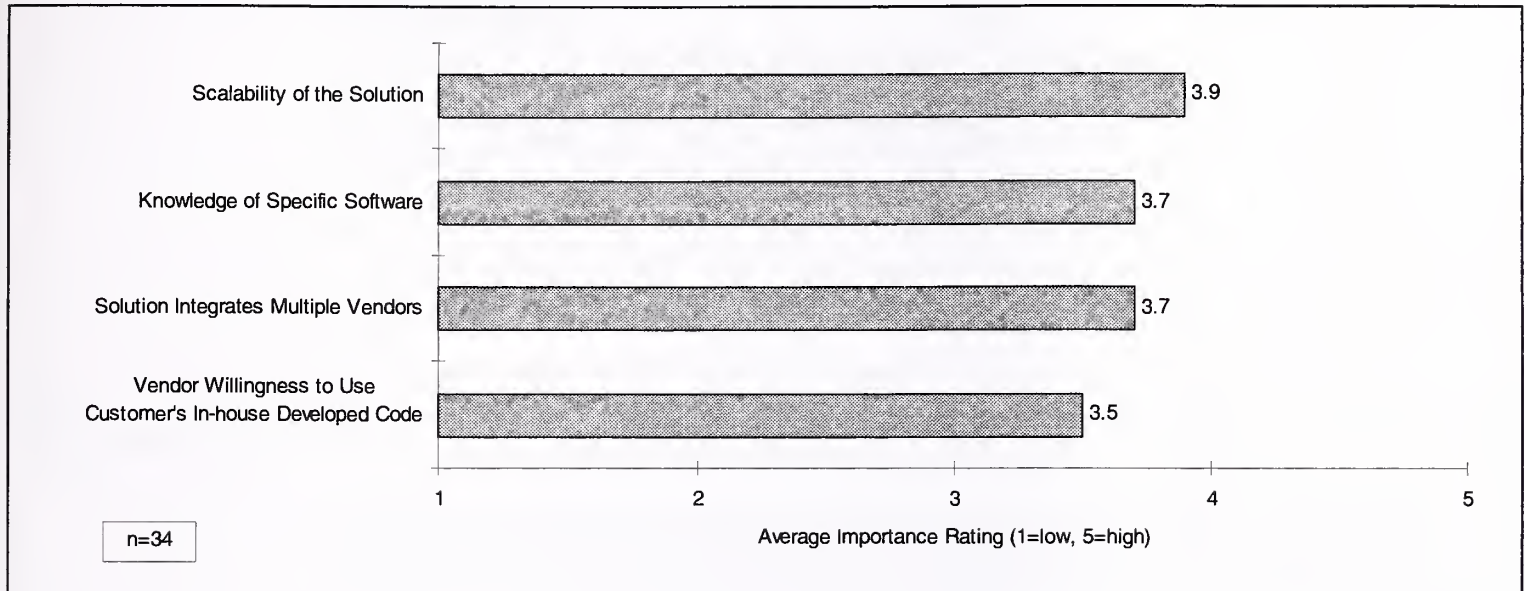


Source: INPUT

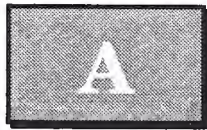
The specific selection criteria that vendors feel they will have to meet to obtain contracts from prospects include knowledge of supply chain outsourcing, ability to deliver integrated solutions, and the ability to deliver scalable solutions.

The relative importance vendors assign to these criteria is shown in Exhibit V-5.

Exhibit V-5

Vendors' Perception of Customer's Solution Selection Criteria*Source: INPUT*

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Definition of Terms

A

Introduction

INPUT's *Definition of Terms* provides the framework for all of INPUT's market analyses and forecasts of the information services industry. It is used for all U.S. programs, in Europe, and for INPUT's worldwide forecasts.

One of the strengths of INPUT's market analysis services is the consistency of the underlying market sizing and forecast data. Each year, INPUT reviews its industry structure and makes changes if they are required. When changes are made, they are carefully documented and the new definitions and forecasts reconciled to the prior definitions and forecasts. INPUT clients have the benefit of being able to track market forecast data from year to year against a proven and consistent foundation of definitions.

B

Overall Definitions and Analytical Framework

1. Information Services

Information Services are computer/telecommunications-related products and services that are oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Packaged software products, including systems software or applications software (called *Software Products*)
- A combination of computer equipment, packaged software and associated support services that will meet an application systems need (called *Turnkey Systems*)
- People services that support users in developing and operating their own information systems (called *Professional Services*)

- A combination of products (software and equipment) and services in which the vendor assumes total responsibility for the development of a custom integrated solution, or part of a solution, to an information systems need (called *Systems Integration*)
- Services that provide operation and management of all or a significant part of a user's information systems or telecommunications functions under a long-term contract (called *Outsourcing*)
- Use of vendor-provided computer processing services to develop or run applications or provide services such as disaster recovery or data entry (called *Processing Services*)
- *Network Services* has two components:
 - Services that support the delivery of information in electronic form—typically network-oriented services such as value-added networks and electronic mail (called *Network Applications*)
 - Services that support the access and use of public and proprietary information such as on-line databases and news services (called *Electronic Information Services*)
- Services that support the operation and maintenance of computer and digital communication equipment (called *Equipment Services*)

In general, the market for information services does not involve providing equipment to users. The exception is when the equipment is part of an overall service offering such as a turnkey system, an outsourcing contract, or a systems integration project.

The information services market also excludes pure data transport services (i.e., data or voice communications circuits such as T-1 carriers). However, where information transport is associated with a network-based service (e.g., electronic data interchange services) or cannot feasibly be separated from other bundled services (e.g., some outsourcing contracts), the transport costs are included as part of the information services market.

The analytical framework of the information services industry consists of the following interacting factors: overall and industry-specific business environment (trends, events, and issues); technology environment; user information system requirements; size and structure of information services markets; vendors and their products, services, and revenues; distribution channels; and competitive issues.

C

Supply Chain Management

The efficient and effective flow of information across discrete activities is the central information management issue in supply chain management. The discrete activities of supply chain management may include the general administration of the supply chain, accounts payable/receivable, purchasing, order management (e.g., order processing), distribution logistics, manufacturing, order fulfillment, warehousing and inventory management, routing/scheduling, sales forecasting, order/shipment tracking, and customer service.

Completion of the entire supply chain may include a number of combinations of in-house and out-of-house personnel, as well as a number of types of technologies owned and/or managed by these respective parties.

D

Industry Sector Definitions

INPUT structures the information services market into industry sectors such as process manufacturing, insurance, transportation, etc. The definitions of these sectors are based on the most recent revision of the Standard Industrial Classification (SIC) code system. The specific industries (and their SIC codes) included under these industry sectors are detailed in Exhibit A.

INPUT includes all product/service categories except systems software products and equipment services in industry market sectors.

Note: SIC code 88 is Personal Households. INPUT does not currently analyze or forecast information services in this market sector.

Exhibit A

Industry Sector Definitions

Industry Sector	SIC Code	Description
Discrete Manufacturing	23xx	Apparel and other finished products
	25xx	Furniture and fixtures
	27xx	Printing, publishing, and allied industries
	31xx	Leather and leather products
	34xx	Fabricated metal products, except machinery and transportation equipment
	35xx	Industrial and commercial machinery and computer equipment
	36xx	Electronic and other electrical equipment and components, except computer equipment
	37xx	Transportation equipment
	38xx	Instruments; photo/med/optical goods; watches/clocks
	39xx	Miscellaneous manufacturing industry
Process Manufacturing	10xx	Metal mining
	12xx	Coal mining
	13xx	Oil and gas extraction
	14xx	Mining/quarrying nonmetallic minerals
	20xx	Food and kindred products
	21xx	Tobacco products
	22xx	Textile mill products
	24xx	Lumber and wood products, except furniture
	26xx	Paper and allied products
	28xx	Chemicals and allied products
	29xx	Petroleum refining and related industries
	30xx	Rubber and miscellaneous plastic products
	32xx	Stone, clay, glass and concrete
	33xx	Primary metal industries
Transportation Services	40xx	Railroad transport
	41xx	Public transit/transport
	42xx	Motor freight transport/warehousing
	43xx	U.S. Postal Service
	44xx	Water transportation
	45xx	Air transportation (including airline reservation services in 4512)
	46xx	Pipelines, except natural gas
	47xx	Transportation services (including 472x, arrangement of passenger transportation)

Exhibit A
(continued)

Industry Sector Definitions (Cont.)

Industry Sector	SIC Code	Description
Telecommunications	48xx	Communications
Utilities	49xx	Electric, gas and sanitary services
Retail Trade	52xx 53xx 54xx 55xx 56xx 57xx 58xx 59xx	Building materials General merchandise stores Food stores Automotive dealers, gas stations Apparel and accessory stores Home furniture, furnishings and accessory stores Eating and drinking places Miscellaneous retail
Wholesale Trade	50xx 51xx	Wholesale trade - durable goods Wholesale trade - nondurable goods
Banking and Finance	60xx 61xx 62xx 67xx	Depository institutions Nondepository credit institutions Security and commodity brokers, dealers, exchanges and services Holding and other investment offices
Insurance	63xx 64xx	Insurance carriers Insurance agents, brokers and services
Health Services	80xx	Health services
Education	82xx	Educational services

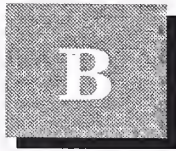
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Exhibit A
(continued)

Industry Sector Definitions (Cont.)

Industry Sector	SIC Code	Description
Business Services	65xx	Real estate
	70xx	Hotels, rooming houses, camps, and other lodging places
	72xx	Personal services
	73xx	Business services (except hotel reservation services in 7389)
	7389	Hotel reservation services
	75xx	Automotive repair, services and parking
	76xx	Miscellaneous repair services
	78xx	Motion pictures
	79xx	Amusement and recreation services
	81xx	Legal services
	83xx	Social services
	84xx	Museums, art galleries, and botanical/zoological gardens
	86xx	Membership organizations
	87xx	Engineering, accounting, research, management, and related services
	89xx	Miscellaneous services
Federal Government	9xxx	
State and Local Government	9xxx	
Miscellaneous Industries	01xx	Agricultural production - crops
	02xx	Agricultural production - livestock/animals
	07xx	Agricultural services
	08xx	Forestry
	09xx	Fishing, hunting and trapping
	15xx	Building construction - general contractors, operative builders
	16xx	Heavy construction - contractors
	17xx	Construction - special trade contractors

Source: INPUT



User and Vendor Questionnaires

User Questionnaire: Opportunities for Outsourcing Supply Chain Management Information Services

[For Questions 1-5, please refer to Table 1]

1. For which of these components have you or will you outsource the IT aspects of the operation?
2. For each component you outsource, what is the name of the outsourcing vendor?
3. For each of these outsourced components, what type of IT service(s) does the vendor provide (e.g., run the application, run the whole department including IT, data processing, ongoing consulting or application maintenance)?
4. Who did you consider to provide this service?

Table 1

Component	Q 1 Outsourced? (Y/N)	Q 2 Vendor? (Name)	Q 3 Type of IT Service?	Q 4 Considered Vendors (Names)
Inbound logistics e.g., raw material purchasing, inbound material tracking				
Manufacturing e.g., scheduling				
Outbound logistics e.g., order fulfillment, inventory management, distribution, routing/scheduling				
Customer Support e.g., sales forecasting, channel management				
Other (Specify) _____				

INTEGRATED SOFTWARE PACKAGES

5. Do you use any integrated software packages in supply chain management?

_____ Yes [If yes] From which software vendors do you buy these packages?

_____ No Skip to Question 6

Table 2

Software Vendors	Q 5 Software Used? (Y/N)
Baan	
BPCS	
DAI	
Encompass	
GATX	
J.D. Edwards	
Oracle	
SAP	
Other (Specify)	
Other (Specify)	

6. On a scale of 1-5 with 1 = not important and 5 = very important, how important to your company is each of the following improvements in supply chain management:

_____ Become more agile
 _____ Achieve competitive advantage
 _____ Increase cost effectiveness through better integration
 _____ Provide mass customization
 _____ Meet demands for "time shrinking"
 _____ Change business from build-to-store to make to-order
 _____ Meet total quality management objectives

Any other highly important benefits from improving supply chain management?

VIEWS ON OUTSOURCING

7. On a scale of 1-5 with 1 = not important and 5 = very important, how important to your company is each of the following benefits of this supply chain management outsourcing?

- _____ Improve cost-effectiveness of IT
- _____ Improve service levels
- _____ Remove in-house involvement
- _____ Introduce up-to-date technologies
- _____ Free in-house personnel
- _____ Want to exploit opportunities in electronic commerce
- _____ Want to exploit opportunities from use of the Internet
- _____ Want to capitalize on growth in distributed systems

Any other highly important benefits from outsourcing?

8. On a scale of 1-5 with 1 = not concerned and 5 = very concerned, how concerned is your company about each of the following liabilities of outsourcing?

- _____ Loss of control
- _____ Knowledge is not transferred from vendor to company
- _____ Vendor puts company at risk
- _____ Customer quality declines
- _____ Outsourcing becomes too expensive

Any other highly important concerns about outsourcing?

EXPENDITURE

[For Question 9, please refer to Table 3]

9. What are your company's expenditures now and in the future on outsourcing of supply chain management — Now? In 2 years? In 5 years?

[If respondent refuses to provide a specific amount, ask for a range—Under \$5 million, \$6-15 million, \$16-30 million, over \$30 million—and place the range in the appropriate cell.]

[If respondent refuses to indicate a range, please ask if the amount is small for the company, a medium-sized investment, or a large expenditure. Place the word “small,” “medium,” or “large” in the appropriate box.]

Table 3

Dollar Expenditures	Now	2 Years	5 Years
Actual amount			
Range if no actual available			
\$0-5 million			
\$6-15 million			
\$16-30 million			
Over \$30 million			
Small			
Medium			
Large			

RESPONSIBILITIES

[For Question 10, please refer to Table 4]

10. For each of the following job titles, who has responsibilities in terms of making the outsourcing decision, defining the requirements, selecting the vendor, negotiating the contract, and day-to-day management?

Place X in appropriate boxes.

Table 4

	Outsourcing Decision	Requirements Definition	Vendor Selection	Vendor Negotiations	Day-to-Day Management
Company Executives					
Business Unit Management					
Business Function Management					
Information Systems					

Comments:

VENDOR SELECTION

11. For each of the following vendor selection criteria, please rate how important it is to your company and how satisfied your company is with the vendor.

Use a scale of 1-5 with 5 being “very important/satisfied”.

Table 5

#	Criterion	Importance (1-5)	Satisfaction (1-5)	Reason for dissatisfaction (if satisfaction rating of 1 or 2)
1	Range of vendor capabilities			
2	Vendor reputation			
3	Competence of vendor personnel			
4	On-time delivery of projects			
5	Cost			
6	Speed of responsiveness			
7	Ability to meet requirements			
8	Knowledge of specific software			
9	Global presence			
10	Solution integrates multiple vendors			
11	Scalability of the solution			
12	Vendor willing to use user's in-house developed code			
13	Other (specify_____)			

OTHER COMMENTS

12. What additional services would you like the vendors to provide?

13. Do you have any other comments you want to make regarding the outsourcing of supply chain management?

Vendor Questionnaire: Opportunities for Outsourcing

Supply Chain Management Information Services

[Refer to Table 1]

1. Which of the following business functions do you address with your outsourcing offerings? (Place an X in each appropriate row.)
2. For each of these outsourcing service offerings, what information services do you specifically provide? (Place an X in each appropriate row.)

Table 1

Category/ Components	Q1 (x)	Q2 Entire Function	Q2 Processing Support	Q2 Software	Q2 Services	Q2 Other (Specify)
Inbound logistics e.g., raw materials purchasing, inbound material tracking						
Manufacturing e.g., scheduling						
Outbound logistics e.g., order fulfillment, inventory mgmt., distribution, routing/scheduling						
Customer Support e.g., sales forecasting, channel mgmt.						
Other (Specify) _____						

3. [If vendor does not provide supply chain outsourcing]...
Why does your company not offer supply chain outsourcing?

What must change before you will start offering it?

[End Interview]

4. Why did you start a supply chain management outsourcing business?
[Prompts: Natural extension of existing outsourcing business, users requested that we offer the service, another vendor requested it of us, other]
5. Who are your primary competitors in each service area [refer to Table 1]?
6. On a scale of 1-5 with 5 being "very important," how do you rank the importance of these supply chain management objectives to your customers?
- _____ Become more agile
 - _____ Achieve competitive advantage
 - _____ Increase cost effectiveness through better integration
 - _____ Provide mass customization
 - _____ Meet demands for "time shrinking"
 - _____ Change business from build-to-store to make-to-order
 - _____ Meet total quality management objectives
 - _____ Other (please specify _____)

7. On a scale of 1-5 with 5 being "very important," how do you rank the importance of the following benefits of supply chain outsourcing?

- _____ Improve cost effectiveness of IT
- _____ Improve service levels
- _____ Remove in-house involvement
- _____ Introduce up-to-date technologies
- _____ Utilize change agents
- _____ Free in-house personnel
- _____ Exploit opportunities in electronic commerce
- _____ Exploit opportunities from use of the Internet
- _____ Capitalize on growth of distributed systems
- _____ Other (please specify _____)

[Refer to Table 2]

8. On a scale of 1-5 with 5 being "very important," how do you rank the importance of each of the following vendor selection criteria?

Table 2

Criterion	Importance (1-5)
Scope of vendor capabilities	
Vendor reputation	
Competence of vendor personnel	
On-time delivery of projects	
Cost control	
Responsiveness	

Cont.

Table 2 (cont.)

Criterion	Importance (1-5)
Commitment to your needs	
Ability to meet requirements	
Knowledge of specific software	
Gainsharing	
Cash infusion (e.g., transfer of assets)	
Global presence	
Solution integrates multiple vendors	
Salability of the solution	
Will use user's in-house developed code	
Other (Please specify_____)	

9. What are your total outsourcing revenues now?
\$_____ millions now?
10. What percent of these outsourcing revenues are from supply chain management outsourcing?
_____ % from SCM outsourcing
11. How important to your total business is your supply chain management service(s)?
Why?
12. What projected revenue targets does your company have for:
\$_____ millions in 2 years?
\$_____ millions in 5 years?

13. What are the keys to your company's reaching these revenue projections?

14a. What percentage of your current customer base came from proactive selling versus reactive selling (e.g., responding to an RFP)?

_____ % proactive

_____ % reactive

14b. By title, what person(s) do you target in your outsourcing sales?

_____ Chief executives

_____ Business unit managers

_____ Business function managers

_____ IS

_____ Other (Please specify) _____

15a. What features and benefits do you highlight?

[Prompts: Asset acquisition, performance transformation, customized services, cost reduction, other]

15b. What is your win rate as a percentage of your proposals submitted?

_____ % wins of all proposals

16. What mechanism (methods) do you use to price the service?

17. Is this pricing mechanism the same as for traditional outsourcing? Why/Why Not?

18. What major changes are likely to happen in this market over the next 5 years? Why?

